CLAIMS:

1. A method of operating a DC/DC up-down converter which has

- an input voltage (U_{in}) and at least a first and a second output voltage (U_A, U_B),
- at least one inductive energy storage means (L_1), which is connected with a first terminal (X_1) to a main switching means (T_1) and can be connected with a second terminal (Y_1) to at least two outputs (A B) via switching means (T_3, D_3),
- output switching means (T_3, D_3) for providing electrical energy for the first and second output voltages(U_A, U_B) by supplying a coil current (I_{L1}),
- a main switching means (T_1) between the inductive energy storage means (L_1) and a DC voltage source generating the input voltage (U_{in}),
- a free-wheeling switching means (T_2 D_2) which makes possible the continuation of the current flow in the inductive means (L_1) if the main switching means (T_1) is switched off and
- a control means (controller) for selective actuation of all switching means (T_1, T_2, T_3, T_4),

wherein

- the first output voltage (U_A), which is lower than the input voltage (U_{in}), is present on the first output (A) and
- the second output voltage (U_B), which is higher than the input voltage (U_{in}), is present on the second output (B)
- at least a further switching means (T_3) for controlling the direction of the coil current (I_{L1}) into the first output (A) or into the second output (B) is connected in series with the first output (A),

characterized in that the control means (controller)

-- controls the output switching means (T_3, T_4), so that in the course of one switching cycle (SZ_1, SZ_2) the coil current (I_{L1}) flows from the second terminal (Y_1) into both output branches (A, B) and

-- controls the main switch (T_1) in the transient state of the up-down converter, so that the average voltage on the first terminal (X_1) is equal to the voltage on the second terminal (Y_1).

2. A method as claimed in claim 1 in which the control means (controller) generates switching phases (Φ_2, Φ_3 and Φ_5, Φ_6, respectively) for the switching means (T_1, T_2, T_3, T_4) and the course of the coil current (I_{L1}) comprises an up-conversion phase and a down-conversion phase, characterized in that the down-conversion phase of the coil current (I_{L1}) comprises at least two switching phases (Φ_2, Φ_3 and Φ_5, Φ_6, respectively).

3. A method as claimed in claim 2, characterized in that the switching cycle (SZ1, SZ2) has all the switching phases (Φ_1, Φ_2, Φ_3 and Φ_4, Φ_5, Φ_6, respectively), exactly once.

4. A method of operating a DC/DC up-down converter which has

- an input voltage (U_{in}) and at least a first and a second output voltage (U_D, U_E),
- at least one inductive energy storage means (L_2), which is connected with a first terminal (X_2) to a DC voltage source generating in the input voltage (U_{in}) and can be connected with a second terminal (Y_2) to the outputs (D, E) via the switching means (T_6, D_4),
- output switching means T_6, D_4) for providing electrical energy for the first and the second output voltage (U_D, U_E) by supplying a coil current (I_{L2}),
- a main switching means (T_5) between a second terminal (Y_2) of the inductive energy storage means (L_2) and the other pole of the DC voltage source, and
- a control means (controller) for selectively actuating all switching means (T_5, T_6, T_7),

wherein

- the first output voltage (U_D), which is lower than the input voltage (U_{in}), is present on the first output (D) and
- the second output voltage (U_E), which exceeds the input voltage (U_{in}), is present on the second output (E),
- at least a further switching means (T_6) for controlling the direction of the coil current (I_{L2}) into the first output (D) or into the second output (E) is connected in series with the first output (D),

characterized in that the control means (controller)

-- controls the output switching means (T_6, T_7), so that in the course of one switching cycle (SZ_3, SZ_4) the coil current (I_{L2}) flows from the second terminal (Y_2) into both output branches (D, E, F) at least once and and

-- controls the main switch (T_5) in the transient state of the up-down converter so that the average voltage on the second terminal (Y_2) of the cloil (L_2) is equal to the voltage on the first terminal (X_1), thus equal to the input voltage (U_{in}).

5. A method as claimed in claim 4, wherein the control means (controller) generates switching phases (Φ_7, Φ_8, Φ_9 and Φ_{10}, Φ_{11}, Φ_{12}, Φ_{13} respectively) for each switching means (T_5, T_6, T_7) and the pattern of the coil current (I_{L2}) has an up-conversion phase and a down-conversion phase, characterized in that the up-conversion phase of the coil current (I_{L2}) comprises at least two switching phases (Φ_7, Φ_8 and Φ_{10}, Φ_{11} respectively).

6. A method as claimed in claim 5, characterized in that the switching cycle (SZ_3, SZ_4) comprises all switching phases (Φ_7, Φ_8, Φ_9 and Φ_{10}, Φ_{11}, Φ_{12}, Φ_{13}, respectively), exactly once.

7. A method as claimed on one of the preceding claims, characterized in that the switching means (T_1, T_2, ..., T_7) are MOSFETs; IGBTs, GTOs or bipolar transistors.

8. Implementation of a method as defined in the Claims 1 to 9, for the operation of a DC/DC up-down converter in electronic appliances in which consumers are to be supplied with different voltages such as, for example, in mobile telephones, PDAs (Personal Digital Assistants) or MP3 players.